

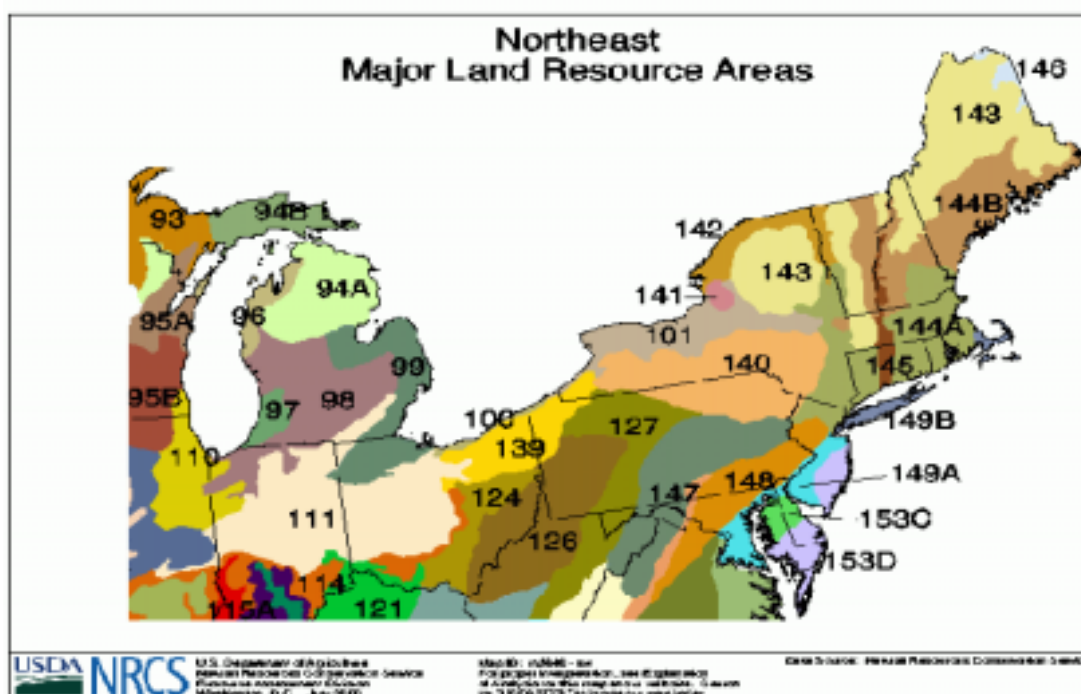
## LAND RESOURCE UNITS, MAJOR LAND RESOURCE AREAS, AND ECOREGIONS OF NEW YORK STATE

### LAND RESOURCE UNITS

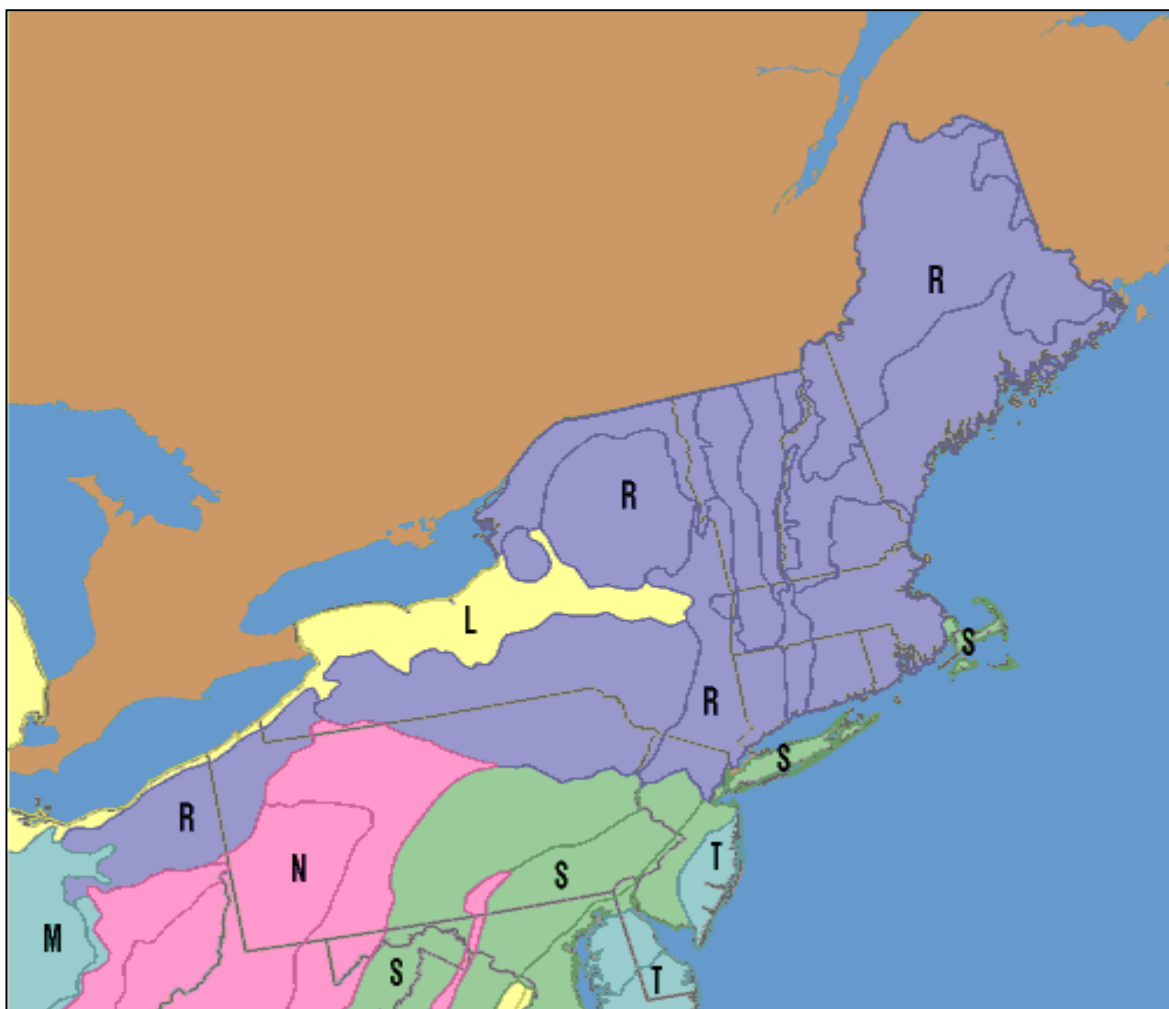
Land resource regions (LRU) are geographic areas, usually several thousand acres in extent, that are characterized by a particular pattern of soils, climate, water resources and land uses. A LRU can be one continuous area or several separate nearby areas.

### MAJOR LAND RESOURCE AREAS

Major land resource areas are geographically associated land resource units delineated by the Natural Resources Conservation Service and characterized by a particular pattern that combines soils, water, climate, vegetation, land use, and type of farming. There are 204 MLRAs in the United States, ranging in size from less than 500,000 acres to more than 60 million acres. Identification of these large areas is important in statewide agricultural planning and has value in interstate, regional, and national planning.



**R-NORTHEASTERN FORAGE AND FOREST REGION**  
**314,540 KM<sup>2</sup> (121,440 MI<sup>2</sup>)**



This cool, humid region consists of plateaus, plains, and mountains. The average annual precipitation ranges from 750 to 1,325 mm. In most of the region more than one-half of the precipitation falls during the freeze-free season. The average annual temperature is 3 to 11 C. The freeze-free period generally is 110 to 160 days but ranges from 80 days in the higher mountains to as long as 200 days in some areas along the Atlantic coast.

Ochrepts and Orthods are the dominant soils. They commonly have a fragipan. Udalfs formed in limy parent material. They also have a fragipan but are less extensive

than the Orchrepts and Orthods. Aqualfs, Aquepts, and Histosols occur in the lowlands and in depressions. Fluvents on flood plains are of small extent but are important for many uses. Stoniness and steep slopes are limitations to use of many of the soils.

Most of the land in this region, especially the steeper areas, is forested. Significant amounts of lumber and pulpwood are produced. Locally, Christmas trees and maple syrup are important forest products. Forage and grains for dairy cattle are the principal crops. In places where markets, climate, and soils are favorable, fruits, tobacco, potatoes, and vegetables are important crops. Wildlife habitat and recreation are important land uses.

## **MLRA 100 - Erie Fruit and Truck Area**

New York, Ohio, and Pennsylvania  
4,260 km<sup>2</sup> (1,640 mi<sup>2</sup>)

### **Land Use:**

Slightly more than two-thirds of this MLRA is in farms, about a third of which is cropland and the rest about equally divided between pasture and woodland. Small areas, however, are used for rural residences and for other purposes. The cropland is used for vineyards, orchards, small fruits, canning crops, and truck crops. Dairying is an important enterprise, especially near the larger cities. A large part of the area not in farms is used for urban development, major highways, and railroads. Parks occupy a sizable acreage.

## **MLRA 101 - Ontario Plain and Finger Lakes Region**

New York  
32,790 km<sup>2</sup> (12,660 mi<sup>2</sup>)

### **Land Use:**

Most of this area is in farms. About one-half of the acreage is cropland used mainly for hay, corn, and small grains associated with dairy operations. Cash crops, including canning and truck crops, wheat, and dry beans, are also produced. Orchard crops are important locally, particularly near Lake Ontario. Vineyards are common near some of the Finger Lakes. About one-third of the area is forested, mostly in farm woodlots. Urban uses account for about 14 percent of the area and are expanding around the larger cities, such as Buffalo, Rochester, and Syracuse.

## **MLRA 127 - Eastern Allegheny Plateau and Mountains**

Maryland, Pennsylvania, and West Virginia  
43,680 km<sup>2</sup> (16,870 mi<sup>2</sup>)

### **Land Use:**

Most of this area consists of farms; about 8 percent is cropland. Corn, small grains, and forage for dairy and beef cattle are the principal crops. Other important crops include potatoes and soybeans. Dairy, beef, and poultry farms are important enterprises. About 3 percent of the area is hardwood forests, most of which is privately owned, although there are large blocks of state forest and game lands and national forests. About 6 percent consists of urban areas and disturbed land, including strip mines. Stabilizing and revegetating strip-mined areas and controlling acid drainage water from coal mines are major concerns of management.

## **MLRA 139 - Eastern Ohio Till Plain**

Ohio and Pennsylvania  
15,030 km<sup>2</sup> (5,800 mi<sup>2</sup>)

### **Land Use:**

About three-fourths of the area is in farms, one-fifth is urbanized, and the remainder is used for other purposes. About one-third is cropland. Feed grains and forage for dairy cattle are the main crops in the west. Similar crops are grown in the east, where there are many part-time farms and many rural residences. Slightly more than 10 percent is pasture. About one-fifth is hardwood forest, mainly in farm woodlots. Some large holdings are used for watershed protection.

## **MLRA 140 - Glaciated Allegheny Plateau and Catskill Mountains**

New Jersey, New York, Pennsylvania, and Ohio  
70,540 km<sup>2</sup> (27,240 mi<sup>2</sup>)

### **Land Use:**

Much of this area is in farms, but a large acreage is in second and third growth forests of oak and northern hardwoods. Urban use is expanding in some places. The Catskills are used mainly for recreation. Hay, pasture, and some grain for dairy cattle are the principal crops. Locally, potatoes are an important crop on the plateau tops, and poultry, fruits, and truck crops are produced in many of the narrow valleys. Abandoned or idle land common in the steeper areas is reverting to grasses, weeds, shrubs, and trees.

## **MLRA 141 - Tughill Plateau**

New York  
3,080 km<sup>2</sup> (1,190 mi<sup>2</sup>)

### **Land Use:**

Most of this area is forested with mixed hardwoods and conifers. Part of the forested land is abandoned cropland that has reverted to forest vegetation. Pulpwood, saw logs, Christmas trees, and maple syrup are the principal forest products. Less than one tenth of the area is cropland. Forage and some feed grains grown for dairy cattle are the main crops. Sizable acreages have reverted to unproductive brush and weeds. Urbanization is insignificant in this area.

## **MLRA 142 - St. Lawrence-Champlain Plain**

New York and Vermont  
14,260 km<sup>2</sup> (5,510 mi<sup>2</sup>)

### **Land Use:**

Most of this area is in farms or forests; only about 6 percent is used for urban development or for other purposes. About one-fourth is cropland, and less than one-tenth is pasture. Hay for dairy cattle is the principal crop, but some small grain and corn are grown for silage. Potatoes are an important cash crop in some places, and a few apple orchards are on the slopes along Lake Champlain, but the total acreage of these crops is small. About one-half of the area is forested with northern hardwoods and conifers. Saw logs and pulpwood are the main forest products. Christmas trees and maple syrup are produced in some localities.

## **MLRA 143 - Northeastern Mountains**

Maine, Massachusetts, New Hampshire, New York, and Vermont  
101,760 km<sup>2</sup> (39,290 mi<sup>2</sup>)

### **Land Use:**

More than 90 percent of this area is forested with northern hardwoods, spruce, and fir. Wood for lumber and pulp for the paper industry are the principal products. Most of the remaining area consists of isolated farms or of small residential developments or is used for recreation. Much of the area of the Adirondacks in New York is in a state park. Although most of the area in New England is privately owned, some large acreages are in national forests, state forests, or state parks. This area is widely used for year-round recreation. Most farming is a parttime enterprise. Erosion on logging roads and ski trails is a potentially serious land use problem.

## **MLRA 144A - New England and Eastern New York Upland, Southern Part**

Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont  
52,040 km<sup>2</sup> (20,090 mi<sup>2</sup>)

### **Land Use:**

About three-fifths of this area is in hardwood and pine forests, most of which are in small holdings. Some are in state forests or in other large holdings. The woodland is used for growing wood products and for hunting and other recreation. Use of woodland for residential development is increasing. About one-sixth of the area is in crops and pasture;

the acreage in crops is somewhat greater than that in pasture. Forage crops for dairy cattle are grown on most of the cropland. Truck crops, small fruits, and apples are grown on some farms, mainly near the larger towns and cities. Many farmsteads are used as rural residences, and the residents earn their living from nonfarm occupations. About one-eighth of the area is urbanized, and the acreage used for this purpose is increasing rapidly. Controlling sedimentation and erosion are concerns of management in areas where urban development is expanding.

## **MLRA 144B - New England and Eastern New York Upland, Northern Part**

Maine, Massachusetts, New Hampshire, New York, and Vermont  
48 570 km<sup>2</sup> (18,750 mi<sup>2</sup>)

### **Land Use:**

About four-fifths of this area is in hardwood and conifer forests, most of which are in small holdings. Some are in state forests or in other large holdings. Saw logs are the principal product, but maple syrup and Christmas trees are produced on some sites. The woodlands are widely used for hunting and other recreation. In some places, significant areas of forestland are used for residential and leisure home developments. About one-eighth of the area is in crops and pasture; the acreage of cropland is somewhat greater than that of pasture. Forage crops for dairy cattle are grown on most of the cropland. Truck crops, small fruits, and apples are grown on some farms, mainly near the larger towns and cities. Many farmsteads are used as rural residences, and the residents earn their living from non-farm occupations. About 5 percent of the area is urbanized. Controlling sedimentation and erosion are concerns of management in areas where urban development is expanding.

## **MLRA 149B - Long Island-Cape Cod Coastal Lowland**

Massachusetts and New York  
6,830 km<sup>2</sup> (2,640 mi<sup>2</sup>)

### **Land Use:**

About one-half of this area is used for urban development, and urban expansion is continuing. Recreation uses are extensive along shorelines. Cropland accounts for less than 10 percent of the area. Cash crops and vegetables such as potatoes, cauliflower, and cabbage are particularly important. In a few places duck and poultry farms are important enterprises. About 25 percent of the land is forested.

## ECOREGIONS

Ecological types are classified and ecological units are mapped based on associations of those biotic and environmental factors that directly affect or indirectly express energy, moisture, and nutrient gradients which regulate the structure and function of ecosystems. These factors include climate, physiography, water, soils, air, hydrology, and potential natural communities.

This material , and the maps and descriptions that follow are from:

United States Forest Service. 1994 . Ecological Subregions of the United States.  
Compiled by W. Henry McNab and Peter E. Avers.  
Prepared in cooperation with Regional Compilers and the ECOMAP Team of the Forest Service.

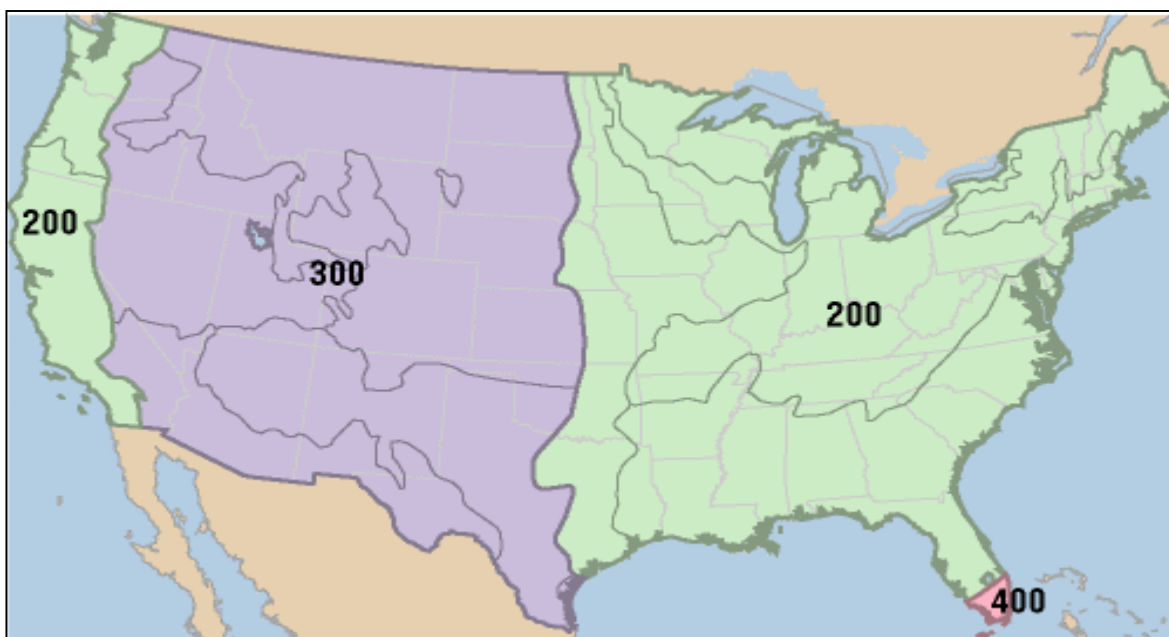
<http://www.fs.usda.gov/land/pubs/ecoregions/index.html>

Also see:

Bailey, R.G., 1995: Description of the ecoregions of the United States. United States Department of Agriculture, Forest Service. Misc. Publ. 1391, Second ed., revised and enlarged. 108 p.

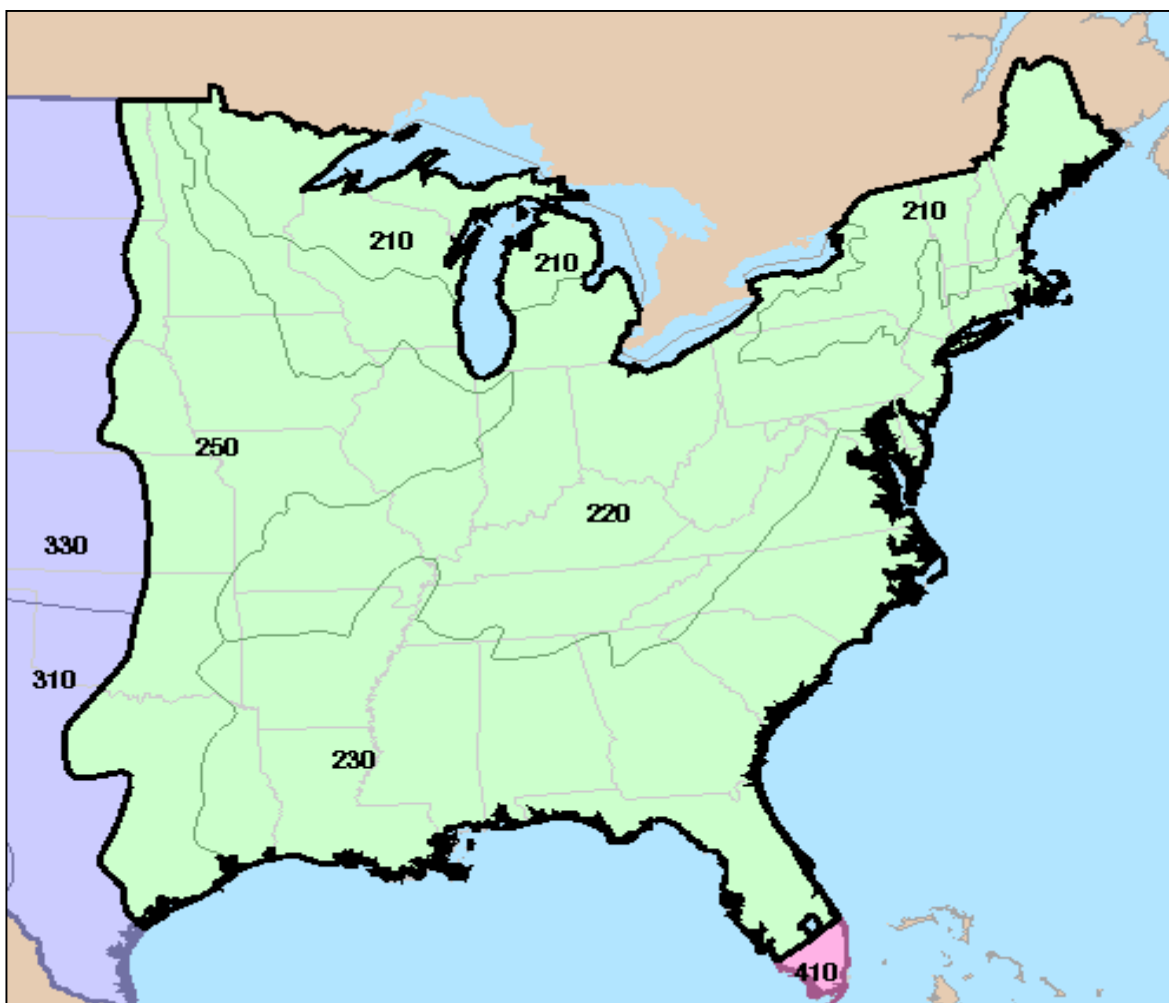


## 200 HUMID TEMPERATE DOMAIN



The climate of the Humid Temperate Domain, located in the middle latitudes (30 to 60 degrees N), is governed by both tropical and polar air masses. The middle latitudes are subject to cyclones; much of the precipitation in this belt comes from rising moist air along fronts within these cyclones. Pronounced seasons are the rule, with strong annual cycles of temperature and precipitation. The seasonal fluctuation of energy and temperature is greater than the diurnal. Climates of the middle latitudes have a distinctive winter season, which tropical climates do not.

The Humid Temperate Domain contains forests of broadleaf deciduous and needleleaf evergreen trees. The variable importance of winter frost determines six divisions: warm continental, hot continental, subtropical, marine, prairie, and Mediterranean.



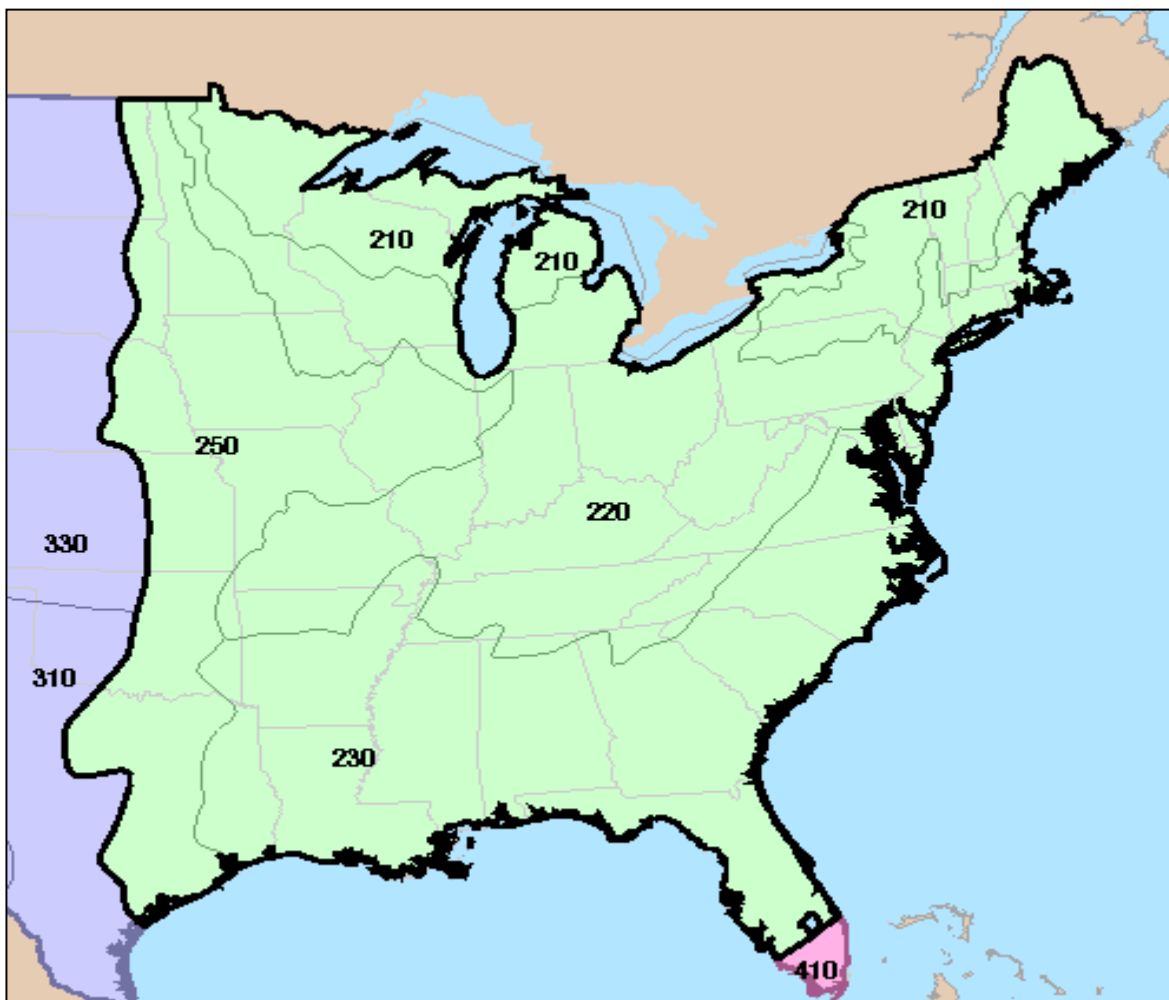
### **210 WARM CONTINENTAL DIVISION**

South of the eastern area of the subarctic climate, in the region between lat. 40 and 55 N. and from the continental interior to the east coast, lies the humid warm-summer continental climate. Located squarely between the source regions of polar continental air masses to the north and maritime or continental tropical air masses to the south, it is subject to strong seasonal contrasts in temperature as these air masses push back and forth across the continent.

In the Koppen-Trewartha system, this area is designated as Dcb, described as a cold, snowy winter climate with a warm summer (see Appendix 2, climate diagram for Iron Mountain, Michigan). The Dcb climate has 4 to 7 months when temperatures exceed 50°F (10°C), with no dry season. The average temperature during the coldest month is below

32°F (0°C). The warm summer signified by the symbol b has an average temperature during its hottest month that never exceeds 72°F (22°C). Precipitation is ample all year, but is substantially greater during the summer.

Needleleaf and mixed needleleaf-deciduous forest grows throughout the colder northern parts of the humid continental climate zone, extending into the mountain regions of the Adirondacks and northern New England. Here soils are Spodosols with a low supply of bases and a horizon in which organic matter, iron, and aluminum have accumulated. They are strongly leached, but have an upper layer of humus. Cool temperatures inhibit bacterial activity that would destroy this organic matter in tropical regions. Soils are deficient in calcium, potassium, and magnesium, and are generally acid. Thus, they are poorly suited to crop production, even though adequate rainfall is generally assured; but conifers thrive in them.



### **220 HOT CONTINENTAL DIVISION**

South of the warm continental climate lies another division in the Humid Temperate Domain, one with hot summers and cool winters (see Appendix 2, climate diagram for Fort Wayne, Indiana). The boundary between the two is the isotherm of 72°F (22°C) for the warmest month. In the warmer sections of the Hot Continental Division, the frost-free or growing season continues for 5 to 6 months, in the colder sections only 3 to 5 months. Snow cover is deeper and lasts longer in the northerly areas.

In the Koppen-Trewartha system, areas in this division are classified as Dca (a signifies hot summer). We include in the Hot Continental Division the northern part of Koppen's Cf climate region in the eastern United States. Koppen uses as boundary between C and D

climates the isotherm of 26.6°F (-3°C) for the coldest month. For example, Koppen places New Haven, Connecticut, and Cleveland, Ohio, in the same climatic region as New Orleans, Louisiana, and Tampa, Florida, despite obvious sharp differences in January mean temperatures, soil groups, and natural vegetation between these northern and southern zones. Trewartha (1968) redefined the boundary between C and D climates as the isotherm of 32°F (0°C) for the coldest month, thereby pushing the climate boundary south to a line extending roughly from St. Louis to New York City. Trewartha's boundary is adopted here in distinguishing between humid continental and humid subtropical climates.

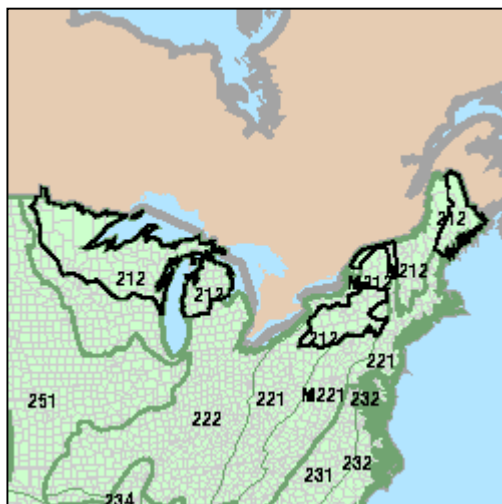
Vegetation in this climate division is winter deciduous forest, dominated by tall broadleaf trees that provide a continuous dense canopy in summer, but shed their leaves completely in winter. Lower layers of small trees and shrubs are weakly developed. In spring, a luxuriant ground cover of herbs quickly develops, but is greatly reduced after trees reach full foliage and shade the ground.

Soils are chiefly Inceptisols, Ultisols, and Alfisols, rich in humus and moderately leached, with a distinct light-colored leached zone under the dark upper layer. The Ultisols have a low supply of bases and a horizon in which clay has accumulated. Where topography is favorable, diversified farming and dairying are the most successful agricultural practices.

Rainfall decreases with distance from the ocean. Therefore, this division is subdivided into moist oceanic and dry continental provinces.

## 212 LAURENTIAN MIXED FOREST PROVINCE

North-central lake-swamp-morainic plains, New England lowlands  
381,500 km<sup>2</sup> (147,300 mi<sup>2</sup>)



**Climate:** Winters are moderately long and somewhat severe, but more than 120 days have temperatures above 50°F (10°C). Average annual temperatures range from 35 to 50°F (2 to 10°C). A short growing season imposes severe restrictions on agriculture; the frost-free season lasts from 100 to 140 days. Snow usually stays on the ground all winter. During winter, the province lies north of the main cyclonic belt; but during summer it lies within this belt, and the weather is changeable. Average annual precipitation is moderate, ranging from 24 to 45 in (610 to 1,150 mm); maximum precipitation comes in summer.

**Land-Surface Form:** Most of this province has low relief, but rolling hills occur in many places. Lakes, poorly drained depressions, morainic hills, drumlins, eskers, outwash plains, and other glacial features are typical of the area, which was entirely covered by glaciers during parts of the Pleistocene. Elevations range from sea level to 2,400 ft (730 m).

**Vegetation:** This province lies between the boreal forest and the broadleaf deciduous forest zones and is therefore transitional. Part of it consists of mixed stands of a few coniferous species (mainly pine) and a few deciduous species (mainly yellow birch, sugar maple, and American beech); the rest is a macromosaic of pure deciduous forest in favorable habitats with good soils and pure coniferous forest in less favorable habitats with poor soils. Mixed stands have several species of conifer, mainly northern white pine in the Great Lakes region, with an admixture of eastern hemlock. Eastern redcedar is found in the southeast. Pine trees are often the pioneer woody species that flourish in burned-over areas or on abandoned arable land. Because they grow more rapidly than deciduous species

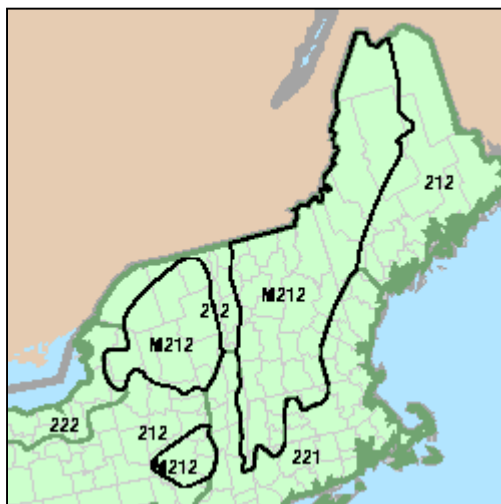
where soils are poor, they quickly form a forest canopy; but where deciduous undergrowth is dense, they have trouble regenerating, and remain successful only where fire recurs. Fires started by lightning are common in this province, particularly where soils are sandy and there is a layer of dry litter in summer.

**Soils:** The greatly varying soils include peat, muck, marl, clay, silt, sand, gravel, and boulders, in various combinations. Spodosols are dominant in New England and along the Great Lakes coast; Inceptisols and Alfisols dominate farther inland. The Alfisols are medium to high in bases and have gray to brown surface horizons and subsurface horizons of clay accumulation.

**Fauna:** In winter, the shorttail weasel (ermine) and snowshoe hare turn white, as they do in polar provinces. The black bear, striped skunk, marmot, chipmunk, and two genera of jumping mice all pass the winter in hibernation. So do badger and the striped ground squirrel that live in the western parts of the province. Beaver and muskrat remain active all winter, working beneath the ice that covers the lakes and streams. Ptarmigan also turn white in winter. Many other birds, especially insectivorous species, migrate south. Common summer resident birds include the white-throated sparrow, northern junco, and yellow-bellied sapsucker.

## M212 ADIRONDACK-NEW ENGLAND MIXED FOREST--CONIFEROUS FOREST--ALPINE MEADOW PROVINCE

Adirondack-New England highlands  
112,900 km<sup>2</sup> (43,600 mi<sup>2</sup>)



**Climate:** The climate, a continental forest type, is characterized by warm summers. Because maritime air masses have year-round access to the eastern seaboard, precipitation is evenly distributed throughout the year, distinguishing this climate from that of the Laurentian Mixed Forest Province. To the west and north, well-defined summer maximum and winter minimum temperatures reflect the predominance of tropical air masses in summer and continental-polar air masses in winter. Winter can be severely cold, as in Wisconsin, but is less so closer to the ocean. Average annual temperatures range from 37 to 52°F (3 to 11°C). The average length of the frost-free period is about 100 days. Precipitation in Albany, New York, averages 35 in (890 mm) per year. Average annual snowfall is more than 100 in (2,550 mm).

**Land-Surface Form:** This province is composed of subdued glaciated mountains and maturely dissected plateaus of mountainous topography. The mountains and plateaus are underlain by granite and metamorphic rocks and thinly mantled by glacial till. Many glacially broadened valleys have glacial outwash deposits and contain numerous swamps and lakes. The relief is between 1,000 and 3,000 ft (300 and 900 m). Elevations range from 500 to 4,000 ft (150 to 1,220 m); a few isolated peaks are higher than 5,000 ft (1,500 m).

**Vegetation:** This mountainous region is in the transition zone between the boreal spruce-fir forest to the north and the deciduous forest to the south. Growth form and species are very similar to those found to the north, but red spruce tends to replace white spruce. Vertical vegetational zonation is present. Valleys contain a hardwood forest where the



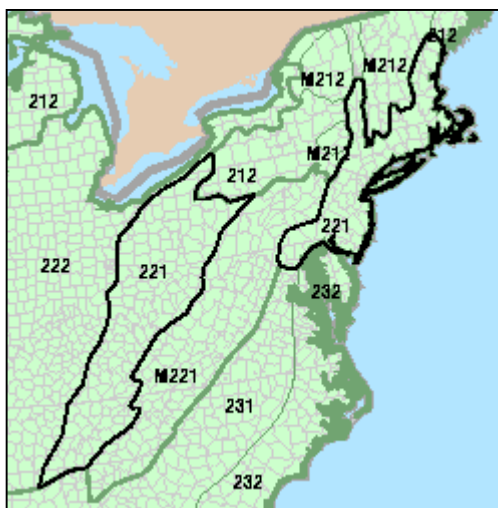
principal trees are sugar maple, yellow birch, and beech, with an admixture of hemlock. Low mountain slopes support a mixed forest of spruce, fir, maple, beech, and birch. The compensating effect of latitude is apparent in the altitudinal limits of zonation, which rise in elevation as one moves south: the approximate lower limit of spruce and fir on Mt. Katahdin is 500 ft (150 m); in the White Mountains, about 2,500 ft (800 m); in the Adirondack Mountains, 3,000 ft (900 m); and in the Catskills, 3,500 ft (1,100 m). Above the mixed-forest zone lie pure stands of balsam fir and red spruce, which devolve into krummholz at higher elevations. Above timberline on Mount Washington, there is tundralike growth called alpine meadow.

**Soils:** Most soils are Spodosols that are stony, cool, and moist.

**Fauna:** This community shares some species with both the Laurentian Mixed Forest and boreal forest, but some species are unique to its alpine tundra, such as longtail shrew, boreal (southern) redback vole, gray-cheeked thrush, spruce grouse, and gray jay.

## 221 EASTERN BROADLEAF FOREST (OCEANIC) PROVINCE

Appalachian Plateaus, New England lowlands, mid-Atlantic coastal plain, Piedmont Plateau  
270,700 km<sup>2</sup> (104,500 mi<sup>2</sup>)



**Climate:** The continental climatic regime here ensures a strong annual temperature cycle, with cold winters and warm summers. Average annual temperatures range from 40 to 60°F (4 to 15°C). There is year-round precipitation, averaging from 35 to 60 in (890 to 1,530 mm) per year. Precipitation is markedly greater in the summer months, when evapotranspiration is great and moisture demands are high. Only a small water deficit is incurred in summer, whereas a large surplus normally develops in spring.

**Land-Surface Form:** This province includes topography of diverse nature and origin. The northern part has been glaciated. West of the Appalachian Mountains are the Appalachian Plateaus. The sedimentary formations there are nearly horizontal, a typical plateau structure, but they are so elevated and dissected that the landforms are mostly hilly and mountainous. Altitudes range from about 1,000 ft (300 m) along their western edge to somewhat more than 3,000 ft (900 m) on the eastern edge. East of the mountains is the Piedmont Plateau and coastal plain, where altitudes range from sea level to about 1,000 ft (300 m).

**Vegetation:** This province is characterized by a winter deciduous forest (sometimes called temperate deciduous forest) dominated by tall broadleaf trees that provide a dense, continuous canopy in summer and shed their leaves completely in winter. Lower layers of small trees and shrubs develop weakly. In spring, a luxuriant ground cover of herbs quickly develops, but is greatly reduced after trees reach full foliage and shade the ground. Forest vegetation is divided into three major associations: mixed mesophytic, Appalachian oak, and pine-oak. Mixed mesophytic vegetation, the deciduous forest with the greatest

diversity, occupies moist, well-drained sites in the Appalachian Plateaus. Widespread dominants include American beech, tuliptree (also called yellow-poplar), several basswoods, sugar maple, sweet buckeye, red oak, white oak, and eastern hemlock, in addition to 20-25 other species. The best indicators of this association are buckeye and basswood. The Appalachian oak association occurs east of the mountains. The dominant species are white oak and northern red oak. Chestnut formerly was abundant, but a blight has destroyed most of this species.

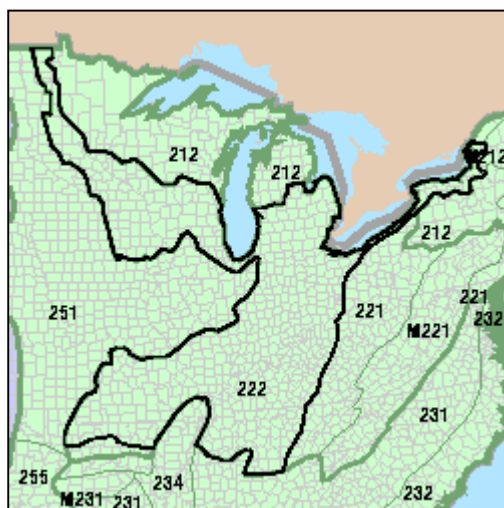
Pine-oak forest: sometimes called "Pine Barrens"--occupies dry sandy soils that are frequently exposed to naturally occurring fires along the northern Coastal Plain. There is a thick shrub layer beneath the pines. Atlantic white-cedar swamps occur on mesic sites.

**Soils:** The pedogenic process associated with deciduous forest is podzolization, moderated by warm wet winters. As a result, soils are characteristically Alfisols. Toward lower latitudes, the tendency to laterization becomes stronger and Ultisols are encountered. Inceptisols are found on the plateaus. In the deciduous forests, a thick layer of leaves covers the ground and humus is abundant.

**Fauna:** Important mammals include the whitetail deer, black bear, bobcat, gray fox, raccoon, gray squirrel, fox squirrel, eastern chipmunk, white-footed mouse, pine vole, shorttail shrew, and cotton mouse. Bird populations are large. The turkey, ruffed grouse, bobwhite, and mourning dove are game birds in various parts of the province. The most abundant breeding birds include the cardinal, tufted titmouse, wood thrush, summer tanager, red-eyed vireo, blue-gray gnatcatcher, and Carolina wren. Characteristic reptiles include the box turtle, common garter snake, and timber rattlesnake.

## 222 EASTERN BROADLEAF FOREST (CONTINENTAL) PROVINCE

East-Central Drift and Lake-Bed Flats, Ozark Highlands, eastern interior uplands and basins  
699,300 km<sup>2</sup> (270,000 mi<sup>2</sup>)



**Climate:** The climate has many characteristics in common with the oceanic broadleaf forest to the east, but precipitation decreases in quantity and effectiveness as one moves inland. Average annual temperatures range from 40°F (4°C) in the north to 65°F (18°C) in the south. Summers are hot, with frequent tornadoes. Precipitation varies from 20 in (510 mm) near the 95th meridian to 40 in (1,020 mm) in Ohio, and to 50 in (1,280 mm) in Tennessee. Most precipitation takes place during the growing season.

**Land-Surface Form:** Most of the area is rolling, but some parts are nearly flat and in the Ozark Highlands the relief is moderate (up to 1,000 ft [300 m]). Low rolling hills, dissected plateaus, and basins are found in Tennessee and Kentucky. The northern parts of the province have been glaciated, but not the southern. Elevations range from 80 to 1,650 ft (24 to 500 m).

**Vegetation:** Like its counterpart to the east, this province is dominated by broadleaf deciduous forest, but the smaller amounts of precipitation found here favor the drought-resistant oak-hickory association. Although other forests have oak and hickory, only this particular forest association has both species in abundance. The oak-hickory forest is medium-tall to tall, becoming savannalike in its northern reaches from eastern Oklahoma to Minnesota, where it gradually turns into prairie (described below for the Prairie Parkland [Temperate] Province). From eastern Kansas to Indiana, it forms a mosaic pattern with prairie. Widespread dominants are white oak, red oak, black oak, bitternut hickory, and shagbark hickory. The understory is usually well developed, often with flowering dogwood. Other understory species include sassafras and hophornbeam. The shrub layer is

distinct, with some evergreens. Many wildflower species occur. Wetter sites typically feature an abundance of American elm, tuliptree, and sweet gum. Northern reaches of the oak-hickory forest contain increasing numbers of maple, beech, and basswood. The maple-basswood forest, dominated by sugar maple and American basswood, occurs from central Minnesota south through Wisconsin and northeastern Iowa. Glaciated areas of Ohio and Indiana feature a beech-maple forest defined by American beech and sugar maple. In these latter associations, oak and hickory occur on poor sites.

**Soils:** As in the oceanic broadleaf forest, the soils change from Alfisols in the north to Ultisols in southerly latitudes. Toward the continental interior, calcification sets in as forest soils give way to the darker soils of the grasslands (Mollisols).

**Fauna:** In the oak-hickory forest, acorns and hickory nuts provide abundant food for the ubiquitous gray squirrel. Fox squirrels are often found, as are eastern chipmunks. Roving flocks of blue jays also feed on forest nuts. In summer, scarlet and/or summer tanagers, rose-breasted grosbeaks, and ovenbirds are common. The wild turkey is also found here. The cerulean warbler is common in the beech-maple forest, and occurs elsewhere as well.